

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

Listing of Claims

1. (Currently Amended) An apparatus for converting a first information signal of standard definition comprised of multiple items of information data into a second information signal of high definition image data comprised of multiple items of information data ~~for processing an information signal that converts a first information signal comprised of multiple items of information data into a second information signal comprised of multiple items of information data,~~ the apparatus comprising:

class tap extraction means for extracting as a class tap multiple items of information data located in a periphery of a target position in the first information signal based on the first information signal;

class categorization means for obtaining a first class code by categorizing the class tap extracted by the class tap extraction means as any one of a plurality of classes based on the class tap;

dynamic range processing means for detecting a dynamic range which is a difference between a maximum value and a minimum value of the multiple items of information data contained in the class tap extracted by the class tap extraction means based on the class tap, to obtain area information that indicates which one of a plurality of sub-divided areas obtained by dividing a possible area of the dynamic range into plural ones the dynamic range belongs to;

class code conversion means for converting the first class code obtained by the class categorization means into one or a plurality of second class codes each corresponding to the first class code;

prediction tap extraction means for extracting as a prediction tap multiple items of information data located in a periphery of the target position in the first information signal based on the first information signal;

first coefficient data generation means for generating first coefficient data, which is used in an estimate equation corresponding to the first class code obtained by the class categorization means;

second coefficient data generation means for generating second coefficient data, which is used in the estimate equation, corresponding to one or the plurality of second class codes, respectively, obtained through conversion by the class code conversion means;

first computation means for calculating information data based on the estimate equation, by using the first coefficient data generated by the first coefficient data generation means and the prediction tap extracted by the prediction tap extraction means;

second computation means for calculating information data based on the estimate equation, by using the second coefficient data generated by the second coefficient data generation means and the prediction tap extracted by the prediction tap extraction means; and

addition means for outputting the information data calculated by the first computation means as information data that constitutes the second information signal corresponding to a target position in the first information signal if the dynamic range belongs to one sub-divided area according to the area information obtained by the dynamic range processing means and, if the dynamic range belongs to another sub-divided area different from

the one sub-divided area, outputting data obtained by performing addition mean on the information data calculated by the first computation means and that calculated by the second computation means as the information data that constitutes the second information signal corresponding to the target position in the first information signal,

wherein the first coefficient data generated by the first coefficient data generation means and the second coefficient data generated by the second coefficient data generation means are based on a result of learning between a first learning signal that corresponds to the first information signal and a second learning signal that corresponds to the second information signal by use of such a portion of the dynamic range as to belong to the one sub-divided area; and

wherein the class code conversion means converts the first class code into the second class code in such a manner that the addition mean value of the information data calculated by the first computation means corresponding to the first class code and the information data calculated by the second computation means corresponding to the second class code may most approach a true value of the information data that constitutes the second information signal.

2.(Original) The apparatus for processing the information signal according to claim 1, wherein the dynamic range processing means obtains area information that indicates whether the dynamic range is less than a threshold value or not less than the threshold value.

3.(Original) The apparatus for processing the information signal according to claim 2, wherein if the dynamic range is not less than the threshold value, the addition means outputs information data obtained by the first computation means as information data that

constitutes the second information signal corresponding to a target position in the first information signal and, if the dynamic range is less than the threshold value, outputs data obtained by performing addition mean on information data obtained by the first computation means and that obtained by the second computation means as information data that constitutes the second information signal corresponding to the target position in the first information signal.

4.(Original) The apparatus for processing the information signal according to claim 1, wherein the first coefficient data generation means and the second coefficient data generation means each comprise:

storage means for storing coefficient data which is obtained beforehand and which is used in the estimate equation of each class; and

coefficient data reading means for reading coefficient data that corresponds to a class indicated by a class code from the storage means.

5.(Original) The apparatus for processing the information signal according to claim 1, wherein the first coefficient data generation means and the second coefficient data generation means each comprise:

storage means for storing coefficient seed data that is obtained beforehand for each class and is coefficient data in a production equation, which includes a predetermined parameter, for producing coefficient data to be used in the estimate equation; and

coefficient data production means for producing coefficient data to be used in the estimate equation based on the production equation by using the coefficient seed data corresponding to a class indicated by a class code stored in the storage means.

6.(Original) The apparatus for processing the information signal according to claim 1, wherein the class code conversion means is configured by a lookup table in which a correspondence relationship between the first class code and the second class code is stored.

7.(Original) The apparatus for processing the information signal according to class 1, wherein the information signal is an image signal or an audio signal.

8.(Currently Amended) ~~A method~~ An image quality improvement method executed by a processor for converting a first information signal of standard definition comprised of multiple items of information data into a second information signal of high definition image data comprised of multiple items of information data ~~for processing an information signal that converts a first information signal comprised of multiple items of information data into a second information signal comprised of multiple items of information data~~, the method comprising:

a class tap extraction step of extracting as a class tap multiple items of information data located in a periphery of a target position in the first information signal based on the first information signal;

a class categorization step of obtaining a first class code by categorizing the class tap extracted by the class tap extraction step as any one of a plurality of classes based on the class tap;

a dynamic range processing step of detecting a dynamic range which is a difference between a maximum value and a minimum value of the multiple items of information data contained in the class tap extracted by the class tap extraction step based on the class tap, to obtain area information that indicates which one of a plurality of sub-divided areas obtained by dividing a possible area of the dynamic range into plural ones the dynamic range belongs to;

a class code conversion step of converting a first class code obtained by the class categorization step into one or a plurality of second class codes each corresponding to the first class code;

a prediction tap extraction step of extracting as a prediction tap multiple items of information data located in a periphery of the target position in the first information signal based on the first information signal;

a first coefficient data generation step of generating first coefficient data, which is used in an estimate equation corresponding to the first class code obtained by the class categorization step;

a second coefficient data generation step of generating second coefficient data, which is used in the estimate equation, corresponding to one or the plurality of second class codes, respectively, obtained through conversion by the class code conversion step;

a first computation step of calculating information data based on the estimate equation, by using the first coefficient data generated by the first coefficient data generation step and the prediction tap extracted by the prediction tap extraction step;

a second computation step of calculating information data based on the estimate equation, by using the second coefficient data generated by the second coefficient data generation step and the prediction tap extracted by the prediction tap extraction step; and

an addition step of outputting the information data calculated by the first computation step as information data that constitutes the second information signal corresponding to a target position in the first information signal if the dynamic range belongs to one sub-divided area according to the area information obtained by the dynamic range processing step and, if the dynamic range belongs to another sub-divided area different from the one sub-divided area, outputting data obtained by performing addition mean on the information data calculated by the first computation step and that calculated by the second computation step as the information data that constitutes the second information signal corresponding to the target position in the first information signal,

wherein the first coefficient data generated by the first coefficient data generation step and the second coefficient data generated by the second coefficient data generation step are based on a result of learning between a first learning signal that corresponds to the first information signal and a second learning signal that corresponds to the second information signal by use of such a portion of the dynamic range as to belong to the one sub-divided area; and

wherein in the class code conversion step, the first class code is converted into the second class code in such a manner that the addition mean value of the information data calculated by the first computation step corresponding to the first class code and the information data calculated by the second computation step corresponding to the second class code may most approach a true value of the information data that constitutes the second information signal.

9. (Canceled)

10.(Currently Amended) A non-transitory recording medium on which a computer-readable program is recorded, the program ~~A program for causing a computer to perform a method for an image quality improvement method, executed by a processor, for converting a first information signal of standard definition comprised of multiple items of information data into a second information signal of high definition image data comprised of multiple items of information data~~ processing an information signal, in order to convert a first information signal comprised of multiple items of information data into a second information signal comprised of multiple items of information data, the method comprising:

a class tap extraction step of extracting as a class tap multiple items of information data located in a periphery of a target position in the first information signal based on the first information signal;

a class categorization step of obtaining a first class code by categorizing the class tap extracted by the class tap extraction step as any one of a plurality of classes based on the class tap;

a dynamic range processing step of detecting a dynamic range which is a difference between a maximum value and a minimum value of the multiple items of information data contained in the class tap extracted by the class tap extraction step based on the class tap, to obtain area information that indicates which one of a plurality of sub-divided areas obtained by dividing a possible area of the dynamic range into plural ones the dynamic range belongs to;

a class code conversion step of converting a first class code obtained by the class categorization step into one or a plurality of second class codes each corresponding to the first class code;

a prediction tap extraction step of extracting as a prediction tap multiple items of information data located in a periphery of the target position in the first information signal based on the first information signal;

a first coefficient data generation step of generating first coefficient data, which is used in an estimate equation corresponding to the first class code obtained by the class categorization step;

a second coefficient data generation step of generating second coefficient data, which is used in the estimate equation, corresponding to one or the plurality of second class codes, respectively, obtained through conversion by the class code conversion step;

a first computation step of calculating information data based on the estimate equation, by using the first coefficient data generated by the first coefficient data generation step and the prediction tap extracted by the prediction tap extraction step;

a second computation step of calculating information data based on the estimate equation, by using the second coefficient data generated by the second coefficient data generation step and the prediction tap extracted by the prediction tap extraction step; and

an addition step of outputting the information data calculated by the first computation step as information data that constitutes the second information signal corresponding to a target position in the first information signal if the dynamic range belongs to one sub-divided area according to the area information obtained by the dynamic range processing step and, if the dynamic range belongs to another sub-divided area different from the one sub-divided area, outputting data obtained by performing addition mean on the information data calculated by the first computation step and that calculated by the second computation step

as the information data that constitutes the second information signal corresponding to the target position in the first information signal,

wherein the first coefficient data generated by the first coefficient data generation step and the second coefficient data generated by the second coefficient data generation step are based on a result of learning between a first learning signal that corresponds to the first information signal and a second learning signal that corresponds to the second information signal by use of such a portion of the dynamic range as to belong to the one sub-divided area; and

wherein in the class code conversion step, the first class code is converted into the second class code in such a manner that the addition mean value of the information data calculated by the first computation step corresponding to the first class code and the information data calculated by the second computation step corresponding to the second class code may most approach a true value of the information data that constitutes the second information signal.

Claims 11-26 (Canceled)

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